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The relationship between spatial orientation and attention in construction workers

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Abstract: The choice of this study was influenced by the relevance and dynamism of the construction industry, a continuously expanding and important sphere in the industrial context. The dynamics of the construction sector, manifested by the constant demand for innovative structures and the desire of individuals to live in spaces that reflect the latest trends, generate fierce competition among investors to propose novel architectural solutions. This situation is driving construction professionals to constantly improve their skills and adapt to new challenges. This study highlights the importance of comprehensively investigating the skills of construction workers, particularly in terms of spatial and concentration skills, which are essential for performance in this profession. From a structural perspective, the dissertation addresses two fundamental dimensions: a theoretical framework and an applied component. The applied section is divided into a chapter on research methodology, where key concepts such as study objectives and hypotheses, sample selection according to established criteria, research design and applicable ethical norms are elucidated, and a chapter focusing on data analysis and interpretation, which encompasses a detailed examination of the hypotheses and culminates in relevant psychological interpretations.

Keywords: relationality, spatial orientation, attention, workers, construction

1. Spatial orientation

1.1. Conceptual delimitations

Spatial orientation is an intrinsic ability of organisms to orient and navigate in their environment, an attribute considered vital for survival. Chamizo and Rodrigo (2019) highlight this ability as fundamental to biological existence. Benton and Tranel (1993, cited by Berg & Ruis, 2017) describe spatial orientation as the competence to identify the location and direction of objects or landmarks in space. Ekstrom et al.

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(2018) add that during navigation, subjects acclimatise to an environment, accumulating knowledge about its features, which is subsequently encoded and retained in long-term memory to be accessed and used for various purposes.

The conceptualisation of spatial orientation extends this definition, referring to an individual's ability to adjust and coordinate body orientation and posture in relation to environmental stimuli. Spatial orientation efficiency relies on accurate perception, integration and interpretation of sensory data of a visual, vestibular - the latter mediated by specialised structures in the inner ear - and proprioceptive nature, coming from receptors located in the skin, muscles, tendons and joints. Pietropaolo and Crusio (2012) note that learning spatial orientation involves acquiring the ability to determine directions to reach specific goals, such as identifying food sources or escaping from dangerous situations.

In colloquial language, the term „orienting" is often used to refer to the process of becoming familiar with a particular situation or context. In an academic context, orientation is frequently associated with adapting to the spatial components of a situation, known as spatial orientation. The etymological origin of the term reflects this connotation; derived from the Latin verb 'oriri', meaning 'to arise' or 'to come from', and the word 'oriens', originally referring to the rising of the sun, the term evolved to indicate the eastern direction and, subsequently, the geographical regions located in that direction, known as the 'East' or 'Orient'. Despite these origins, interpretations of the meaning of spatial orientation and its applicability have varied over time (Schone, 2016).

According to Coluccia and Louse (2004), spatial orientation is the ability to locate oneself relative to a reference point or absolute coordinate system. This skill involves interaction with the environment and considerations of movement, whether actual movement or mental traversal of a map. Human navigation skills are diverse and involve monitoring a person's position and orientation in relation to local and distant landmarks, as well as temporal and spatial assessment of movement.

Wayfinding methodology is a navigation technique focused on reaching a specific goal, requiring the individual to develop a strategy for locating a destination point (Coluccia & Louse, 2004; Saucier et al., 2002). There are two predominant strategies in navigation: landmark-based and Euclidean strategies. The landmark-based strategy uses environmental information to guide the movement, indicating specific times and places to change direction at major landmarks. The Euclidean strategy focuses on the abstract representation of space, involving the use of cardinal directions or precise distances. The latter provides a benefit in situations of orientation error, allowing recalibration of position based on cardinal points, whereas landmark-based strategies can sometimes lead to confusion or disorientation (Saucier et al., 2002).

1.2. Theories of spatial orientation

Since the 1920s, when spatial ability was initially conceptualized and examined through factor analysis as a distinct category of intellectual aptitude (Brown & Stephenson, 1933; El Khoussy, 1935; Kelly, 1928; Murphy, 1936, cited by Guttman et al., 2017), the literature has reflected consistent efforts to further subdivide spatial ability into various sub-domains.

During the course of research in the 1940s and 1950s, the hypothesis of at least two distinct spatial factors was strengthened: spatial orientation and spatial visualization, as indicated by the

The "Black Sea" Journal of Psychology
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www.bspsychology.ro

studies of Michael, Guilford, Fruchter, and Zimmerman (1957) and Michael, Zimmerman, and Guilford (1950), referenced by Guttman et al. (2017).

Over time, the abundance of studies using factor analytic methods has generated a vast, but often divergent, scientific literature. This research has contributed to the emergence of a variety of interpretations and definitions of spatial sub-factors. Lohman (1988, cited by Guttman et al., 2017) identified ten spatial factors, each with specific sets of tests, confirming this by reference to the work of Eliot and Smith (1983, cited by Guttman et al., 2017).

Two main theories of spatial orientation have been developed in the literature. May (2004) suggests that the challenges associated with imaginative perspective shifts can be attributed, at least in part, to interference between sensorimotor and imaginative perspectives. In a complementary approach, Riecke and Von der Heyde (2002) formulated a theoretical framework anchored in a logical sentence structure, defining necessary and sufficient conditions. They put forward the idea that an efficient and automatic spatial updating is only possible when there is coherence between the different self-centred reference frames that can be intertwined, whether mediated by perception of physical reality, experiences in virtual reality or imaginative constructions.

According to the two theories, the underlying mechanisms are similar in that a coherence between egocentric frames of reference, as detailed by Riecke and von der Heyde (2002), correlates with the absence of interference described by May (2004). When current egocentric representations of the environment are in harmony, it is assumed that no interference should occur. Riecke and von der Heyde (2002) postulate that this coherence facilitates automatic spatial updating, which may help explain the ease with which individuals adopt new perspectives in disorienting situations. In contrast, interference or inconsistency between a primary and a secondary egocentric representation, which requires imagining following experiential instructions, may lead to difficulties in adopting a new perspective. It is hypothesized that this type of interference may also clarify why individuals experience challenges in neglecting body rotations. Integrating these theoretical frameworks and information flows into a coherent system not only unifies previously disparate findings and theories, but also promotes a deeper understanding of fundamental processes and generates accurate predictions that can be tested experimentally.

2. Attention

2.1. Conceptual approaches

Attention is the cognitive mechanism by which we select and process a small subset of information from the large mass of data accessible through the senses, memory and other cognitive processes, according to Sternberg and Sternberg (2009). Mihai Golu (2007, p.621) defines attention as a „physiological process involved in the orientation, concentration and selective amplification of mental and psycho-behavioral functions and activities, which are directed towards a specific object and goal, facilitating the achievement of an optimal level of adaptive efficiency".

Mihai Golu offers in his 2007 paper a complex definition of attention, characterizing it as an essential physiological process with a determining role in modulating and selectively amplifying cognitive and behavioral capacities. This process ensures that mental resources are directed towards specific stimuli, with the aim of improving the adaptive efficiency of the individual. By focusing and directing attention, it facilitates optimal interaction with the environment, allowing

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the body to respond appropriately to its challenges and demands. Attention, thus defined, is a central mechanism in achieving higher cognitive performance and effective adaptive behaviours.

William James, a distinguished psychologist and philosopher (1890), describes attention as the act of consciousness focusing, in a clear and intense way, on one of many objects or streams of thought that can potentially coexist at the same moment. This process involves exclusive concentration, a deliberate withdrawal from some elements in order to interact effectively with others.

Since the seventh decade of the last century, there has been a noticeable increase in attention research. This research has not been limited to the analysis of the phenomenon of attention per se, but has also brought attention to its connections with memory processes and executive functions. Understanding how humans learn and manifest behaviour is closely related to our ability to direct attention to the environment, to retain and process information, and to use appropriate cognitive strategies. It is crucial to develop a sound perspective on the development of attention, especially in view of the fact that deficits in attention often have negative consequences in school and work contexts.

Therefore, attention is a topic of primary importance in the study of psychology, especially in the fields of development, learning and psychological disorders. There is no doubt that an understanding of attention and related concepts is an essential pillar of human perception and learning, according to Andrade and Walker's 2021 research.

The study of attention is a central component of the field of cognitive psychology and contemporary cognitive neuroscience. Attention has a fundamental impact on all aspects of human perception, cognition and action, influencing the decisions we make on an ongoing basis. From its very beginnings, there has been a continuing interest in investigating attention within psychology. However, many of the ideas related to attention can be traced back to the philosophers of the 18th and 19th centuries, thus laying the foundations of the discipline of psychology. In the first instance, attention was the subject of philosophers' discussions, which addressed issues such as the role of attention in awareness and conscious thought, and the nature of the voluntary or involuntary directing of attention to objects or events. The philosophers' approaches to characterizing attention reflected their metaphysical views of the world and how individuals acquire knowledge about it, as Andrade and Walker point out in their 2021 paper.

In academic discourse, the significance of attention in the formation of memory has been noted by eminent figures like Joan Luis Vives (1492-1540). Furthermore, Gottfried Leibniz (1646-1716), in his pioneering contributions, introduced the concept of apperception. He defined it as a crucial act indispensable for an individual's recognition and awareness of perceptual events. Leibniz postulated that in the absence of apperception, information fails to permeate the realm of consciousness, encapsulating this idea with the assertion, "Attention is the soul's determination to know one aspect at the expense of others." This highlights the central role attributed to attention in the domains of perception and cognition by various philosophers, leading to an exploration of intricate questions. These include the extent to which attention can be maneuvered either automatically or through deliberate effort. These themes remain at the forefront of contemporary scholarly inquiry and analysis.

Among the early psychologists, the perspectives of William James on attention stand out prominently. His seminal work, "Principles of Psychology" (1890), offers profound insights, where

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Vol. 14, Special Issue, 195-206, Fall, 2023
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www.bspsychology.ro

James contends that "the ability to voluntarily refocus attention, preventing it from wandering and doing so consistently, forms the bedrock of an individual's judgment, character, and will." This statement, as cited by Andrade M. & Walker N., underscores the foundational role of attention in the psychological constitution of an individual.

3. Research methodology

3.1. Objectives

The objective of this scientific research is to explore the dynamics of the interaction between spatial orientation skills and attentional mechanisms in the occupational settings of construction workers.

In this perspective, the research approach has been structured on four detailed objectives, as follows:

1. Systematic assessment of the correlation between spatial orientation skills and the attentional spectrum manifested by construction workers
2. Comparative analysis of attentional performance as a function of operational variables, including working conditions at ground level compared to activities at altitude
3. Probing the impact of ethnicity on attentional development and efficiency in construction workers
4. Dissect the role of ethnicity in shaping and evolving spatial orientation skills among construction professionals.

3.2. Research hypotheses

Against the background of the specific objectives set, the study postulates the following research hypotheses:

H1. A positive association is postulated between spatial orientation skills and the level of attention shown by construction workers, with a possible modulation based on the nationality variable.

H2. Statistically relevant discrepancies related to attention are expected to be identified according to specific working conditions - activities performed at ground level versus activities at height - among construction professionals.

H3. Significant differences in attentional parameters are hypothesised between Romanian and Finnish construction workers.

H4. Significant variations in spatial orientation skills between Romanian and Finnish construction workers are hypothesised.

3.3 Tools used

In order to achieve the objectives and hypotheses developed, the research involves the application of the following instruments: spatial orientation (Cognitrom) and AD (distributive attention) Romb from the RQplus Psiruteva test battery.

3.4. Study participants

The investigated sample, in the context of the application of the cognitive skills tests, consisted of a group of 64 participants, selected through a non-random methodology. The sample

BLACKSEA JOURNAL OF PSYCHOLOGY
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The "Black Sea" Journal of Psychology
Vol. 14, Special Issue, 195-206, Fall, 2023
ISSN: 2068-4649
www.bspsychology.ro

of subjects is represented by employees of various construction companies in Helsinki, Finland. The composition of the sample was stratified according to specific demographic and occupational variables, including nationality, gender, age group, educational level and job type. The proportional distribution of these variables is visualized and detailed in the figure and subsequent series of graphs.

The study population was distributed in an equitable manner, each national group - Romanian and Finnish - being represented by 32 individuals, resulting in a 50% parity for each cohort. Out of the total participants, 23 Romanian citizens were educated at medium level and 9 at higher level. In contrast, the Finnish group consisted of 7 individuals with university education and 25 with postgraduate education. The segmentation of the age variable was executed in two distinct categories: 22-35 years and 36-59 years, with a distribution of 10 Romanians in the first category and 22 in the second, while for the Finns, 8 fell in the first age range and 24 in the second. In terms of gender, the male predominance was significant, with 32 Finnish men and no women, while the Romanian group included 30 men and 2 women. Regarding working conditions, the Romanian sample consisted of 15 workers performing tasks at height and 17 at ground level, while the Finnish cohort consisted of 26 individuals working at height and 6 at ground level.

4. Analysis and interpretation of results

H1. A positive association is postulated between spatial orientation skills and the level of attention shown by construction workers, with possible modulation by the nationality variable.

Table 1. Calculation of Spearman correlation coefficient for Spatial Orientation and Attention by nationality.

Nationality				Spatial_orientation	Attention
Spearman's rho	Romanian	Spatial Orientation	Correlation Coefficient	1.000	**.635****
			Sig. (2-tailed)	.	.000
			N	32	32
		Attention	Correlation Coefficient	.635**	1.000
			Sig. (2-tailed)	.000	.
			N	32	32
	Finnish	Spatial Orientation	Correlation Coefficient	1.000	**.585****
			Sig. (2-tailed)	.	.000
			N	32	32
		Attention	Correlation Coefficient	.585**	1.000
			Sig. (2-tailed)	.000	.
			N	32	32

**. Correlation is significant at the 0.01 level (2-tailed).

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The "Black Sea" Journal of Psychology
Vol. 14, Special Issue, 195-206, Fall, 2023
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www.bspsychology.ro

The analysis of the data presented in table 1 indicates a strong association between spatial orientation skills and attentional capacity in Romanian subjects compared to their Finnish counterparts. The Romanian subjects demonstrate a high correlation, with a correlation coefficient (r) of 0.635, being in the range of 0.6-0.8, which suggests a strong connection, while the Finnish subjects show a correlation of moderate intensity, with a coefficient of 0.585, (between 0.4 and 0.6). Statistical significance (Sig.), staying below the conventional level of 0.05, corroborates the existence of a positive relationship between the two studied variables.

According to specialized literature, a positive correlation is manifested when both variables tend to vary in the same direction; this phenomenon is observed when the increase of one variable is accompanied by the increase of the other, or vice versa, the decrease of one leads to the decrease of the other (Hayes, 2021).

As it follows from the previous analysis, the formulated hypothesis is empirically supported, thus highlighting a positive association between spatial orientation and attentional mechanisms, a correlation that is modulated by the nationality variable and characterized by a mutual interdependence. Spatial orientation is manifested by focusing attention on a specific location, a process that can be triggered by the presence of a new stimulus in the perceptual field (Chun, 2000). Pillsbury (1906, cited by Floru, 1967) postulates that the act of attention involves the recognition of a new element, which, in turn, facilitates the reevaluation of previous perceptions from a new angle. On the other hand, Miclea (1994, cited by Albu et al., 2009) defines spatial orientation as the ability to reconceptualize a perceptual field from an alternative perspective, involving a reconfiguration of the observation point. These theorizations, proposed by Pillsbury and Miclea, emphasize the importance of the adaptability of perceptual perspective, thus supporting the idea of a correlation between spatial orientation and attention.

H2. It is expected to identify relevant statistical discrepancies related to attention according to specific work conditions—ground-level activities versus activities at height—among construction professionals.

Tables 2. Nonparametric Mann-Whitney U Test for Attention and Work Mode

Test Statistics[a]

	Atentie
Mann-Whitney U	324.000
Wilcoxon W	600.000
Z	-2.081
Asymp. Sig. (2-tailed)	.037

a. Grouping Variable: modul_de_lucru

From the table above, where the Sig (2-tailed) is less than 0.05, being 0.037, it appears that there are statistically significant differences between the score obtained by people working on the ground and people working at height in terms of attention.

BLACKSEA JOURNAL OF PSYCHOLOGY
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The "Black Sea" Journal of Psychology
Vol. 14, Special Issue, 195-206, Fall, 2023
ISSN: 2068-4649
www.bspsychology.ro

The construction sector, and especially the activities carried out at height, are frequently categorized as being among the riskiest professions. The formal definition of work at height, according to the Occupational Safety and Health Administration, includes any operation where there is a risk of falling from a certain level to a lower one, such as working on scaffolding or building structures (Cyma-Wejchenig et al ., 2020).

There is an intrinsic fear of heights and falling, a reaction that may have a psychological basis. This fear of heights is justified, given that accidents caused by falls from heights are common and can lead to serious consequences, including death (Cooper, 1998). Easteebook (1959, cited by Cooper, 1998) notes that fear is the emotion most intensely avoided by humans, being a common experience. Fear strongly influences perceptions, thinking, and behavior by suddenly narrowing attention to imminent danger and ignoring other stimuli. However, the primary function of fear is to organize and motivate the avoidance of danger, and as long as it is kept in check, it can serve as a protective mechanism, stimulating prudent risk assessments.

Workers who work at height use attention more intensively than those who work at ground level, simultaneously focusing on height, balance and the task at hand. Studies by Baker (1977), Marshall (1992) and Rachman (1990), all cited by Cooper (1998), indicate heightened concentration during complex tasks. Height workers make compensatory efforts to maintain performance despite the perceived difficulty of tasks.

Cullen and Agnew (2016) found that performing two tasks simultaneously can impair postural control compared to performing a single task. Sample et al. (2016), also cited by Cyma-Wejchenig et al. (2020), emphasize the importance of attentional reweighting to prevent loss of balance during dual tasks, as recovery of balance requires intensive information processing. If attention is not sufficiently allocated to postural tasks, the risk of losing balance and, implicitly, the risk of falling, increases (Schnittjer, 2017; Siu, 2007).

The hypothesis is supported both statistically and psychologically; workers at height engage attention at a significantly more intense level than their colleagues at ground level. In addition to their professional duties, they operate under the pressure of being aware that their safety depends on every move they make, generating acute and sustained attention.

H3. Significant differences in attentional parameters are assumed between construction workers of Romanian nationality compared to those from Finland.

Table 3. Attention comparison table between Romanian and Finnish nationality

Test Statistics[a]

	Atentie
Mann-Whitney U	421.000
Wilcoxon W	949.000
Z	-1.232
Asymp. Sig. (2-tailed)	.218

a. Grouping Variable: Nationalitatea

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The "Black Sea" Journal of Psychology
Vol. 14, Special Issue, 195-206, Fall, 2023
ISSN: 2068-4649
www.bspsychology.ro

According to the non-parametric test for two independent samples Mann-Whitney U, Sig has a value greater than 0.05, there being no significant differences in attention between Romanian and Finnish construction workers, the hypothesis being invalid. The level of attention between Romanians and Finns is similar, resulting in no differences between nationalities.

According to the third hypothesis, which was not positively verified, the absence of a significant statistical disparity in the level of attention between construction workers of Romanian and Finnish nationality is supported. One of the arguments contributing to the rejection of this hypothesis is the structure of the sample, composed mostly of male individuals (62 men versus 2 women). Previous research suggests that men may exhibit increased attentional vigilance (Blatter et al., 2005, cited by Riley et al., 2016), implying that nationality does not modify this construct, as men demonstrate similar levels of attentional vigilance.

Flôres, Menezes, and Katzer (2016) observed that in the skill acquisition stage, men outperformed women in terms of attention. In the transfer tests, the results indicate a significant difference in favor of the male gender, with superior performance and a stronger external focus at a distance compared to the control group.

Analysis of data from the study by Caitlyn, Erdynast, and Miller (2021) also reveals a significant gender disparity, with men scoring higher on counterproductive beliefs, higher self-perceived multitasking ability, and a increased concordance with misconceptions about memory and attention.

In addition, the sample is mainly made up of construction workers between the ages of 36 and 59, which constitute 71.88% of the total participants. This age distribution contributes to the invalidation of the hypothesis, given the research of Lufi and Haimov (2019), which indicated that attentional acuity peaks between 30 and 40 years, followed by a progressive decline. The results of their study are relevant to the effects of aging on cognitive functioning, particularly with regard to sustained attention.

Given that most of the participants are in the age range where attention is at its optimal level and considering the preponderance of the male gender in the sample, the nationality variable did not exert a significant influence on the level of attention; participants showed similar levels of attention, with no significant differences between them.

Even if nationality and cultural differences could modulate construction workers' skills in other ways, in this study, due to the characteristics of the sample, the hypothesis was not confirmed.

H4. It is assumed that there are significant variations in spatial orientation skills between Romanian and Finnish construction workers.

Test Statistics[a]

	Spatial Orientation
Mann-Whitney U	370.500
Wilcoxon W	898.500
Z	-1.913
Asymp. Sig. (2-tailed)	.056

a. Grouping Variable: Nationalitatea

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The invalidation of the last hypothesis can be attributed to the composition of the sample, which is predominantly male (96.88%) and predominantly composed of individuals with medium-level education (75%). The demographic uniformity of the sample led to similar levels of spatial orientation skills, without revealing significant differences between Romanian and Finnish subjects, thus suggesting that nationality did not exert a significant influence on the results.

According to research by Yuan L. et al. (2019), there is evidence indicating a statistical superiority of males over females in spatial skills in general, a result that corroborates findings from previous meta-analyses. This gender superiority in spatial ability appears to be consistent and stable at the macro level. Interestingly, gender differences in individual spatial abilities appear to widen with progress in education from pre-school to tertiary education, suggesting that education widens the gender gap rather than narrows it.

Kell and Lubinski (2013, cited by Porter 2018) support the need to identify groups or individuals with superior mental turnover performance in order to develop effective construction education programs. Professionals in science, technology, engineering, and mathematics (STEM) fields often exhibit advanced levels of these spatial skills.

In the current context, the Romanian and Finnish participants belong to the same professional sector, that of construction. As Cross (2006, cited by Berkan et al. in 2020) points out, design involves the creation and materialization of new concepts, a process that requires a wide spectrum of cognitive abilities, among which spatial ability stands out as crucial. In all STEM disciplines, the ability to mentally visualize and manipulate objects and spaces is essential (Halpern & Collaer, 2005; Nagy-Kondor, 2014; Stieff & Uttal, 2015).

Thus, due to the uniformity in terms of the professional field, the level of education and the gender distribution of the sample, the nationality variable did not significantly change the spatial orientation ability of the participants, making the last hypothesis of the study statistically insignificant and without relevant differences between groups.

Conclusions

The field of constructions has taken a very large scale in recent years, the landscapes being shaded by the heights of the buildings, the green spaces turning into malls and parking lots, and the execution time of the works starting to be shorter and shorter. These changes lead to a great need for builders, who are pressured and overloaded with tasks under the consequence of time and fixed deadlines.

Through this research, we have pursued a well-defined goal, namely, how nationality can influence the concepts of attention and spatial orientation on a sample of Romanians and Finns, who work in the field of construction.

Through statistical analysis, it was demonstrated that there is a strong correlation between spatial orientation and attention in Romanians and an average correlation in Finns. Regarding differences in nationality, we did not find any difference, given the limitations of the sample, as it

The "Black Sea" Journal of Psychology
Vol. 14, Special Issue, 195-206, Fall, 2023
ISSN: 2068-4649
www.bspsychology.ro

was composed of 96.88% men, the predominant ages were between 35 and 59 years, and the level of secondary education was representative.

During the work we also reached other important points, discovering the fine line between working at height and attention on the ground, with the involvement of the 64 participants. Due to the risk factor, heightened by fear, it has been confirmed that workers at height have a much higher attention span. It is necessary to give importance to the effects that cause possible occupational accidents and that represent the consequences of a significant number of deaths.

The culture of Romania and Finland have the continent as a common point, both being part of Europe. The country of happy people is also a very strict country in terms of labor protection, non-compliance with protection by wearing helmets and belts while working is very strict, with frequent checks and very high fines. On the other hand, Romanians have easily adapted to this country, Romanians and Finns being hospitable, optimistic and very respectful.

The research emphasized the importance of the theme and the need for in-depth research in this direction, spatial orientation and attention being indispensable in the field of constructions, and the relationship between the two constructs demonstrating their interdependence. A person cannot orient without focusing attention or selecting objects in the perceptual field, and attention is itself a function of orientation, which requires the selection of certain frames.

The conclusions emphasize the importance of studying the rational coordination of body movements, balance, coordination intertwined with the concentration of mental activity on the objects and phenomena that surround us.

Bibliography

Albu M., Bălaj A., Benga O., Balászi R., Cotârlea P., Curșeu P., Domuța A., David D., Kállay È., Mariș R., Miclea M., Mih V., Opre A., Porumb D., Porumb M., Vaida S. & Visu G. Andrade M. & Walker N., (2021). History of Attention. It can be accessed at: https://socialsci.libretexts.org/Bookshelves/Psychology/Cognitive_Psychology_(Andrade_and_Walker)/11%3A_Attention/11.02%3A_History_of_Attention#title

Berg E.V.D., Ruis C., (2017). Chapter 10 - Space in Neuropsychological Assessment. https://doi.org/10.1016/B978-0-12-801638-1.00010-0.

Caitlyn I. Seymour, Esmé D. Erdynast & Michelle D. Miller (2021) Gender Predicts Beliefs and Knowledge about Attention among College Students, College Teaching, 69:4, 210-217, DOI: 10.1080/87567555.2020.1853026

Chamizo V.D. & T. Rodrigo, (2019). Spatial Orientation, Encyclopedia of Animal Cognition and Behavior: Springer Nature. DOI: https://doi.org/10.1007/978-3-319-47829-6_1416-1

Chun, M. M. (2000). Contextual cueing of visual attention. Trends in Cognitive Sciences

Cooper, (1990). Human Performance Models for Computer-Aided Engineering. DOI: https://doi.org/10.1016/B978-0-12-236530-0.50015-7

Cooper, (1998). Working at heights. Journal of the institution of occupational safety and health. Vol. 2, Issue 1

Cyma-Wejchenig, M., Maciaszek, J., Marciniak, K., & Stemplewski, R. (2020). The Effects of Cognitive Task and Change of Height on Postural Stability and Cardiovascular Stress in Workers

Working at Height. International journal of environmental research and public health, 17(18), 6541. https://doi.org/10.3390/ijerph17186541

Ekstromet, A. D., Spiers, H. J., Bohbot, V. D., &Rosenbaum, R. S. (2018). Human spatial navigation. Princeton: Princeton University Press

Flôres, Menezes & Katzer (2016). INFLUENCES OF GENDER ON ATTENTION AND LEARNING OF MOTOR SKILLS. https://doi.org/10.4025/jphyseduc.v27i1.2706

Floru R. (1967) Psychophysiology of attention. Scientific Publishing House: Bucharest

Golu M., (2007) Fundamentals of psychology, Vol. I, Romania of Tomorrow Foundation Publishing House, Bucharest

Guttman R., Epstein E.E., Amir M. & Guttman L. (2017) A structural theory of spatial ability. Hebrew University of Jerusale. Se poate accesa la: https://conservancy.umn.edu/bitstream/handle/11299/113585/1/v14n3p217.pdf

Lufi D. & Haimov I. (2019) Effects of age on attention level: changes in performance between the ages of 12 and 90, Aging, Neuropsychology, and Cognition, 26:6, 904-919, DOI: 10.1080/13825585.2018.1546820

May, M. (2004). Imaginal perspective switches in remembered environments: Transformation versus interference accounts. Cognitive Psychology

Pietropaolo S., Crusio W.E. (2012) Learning Spatial Orientation. In: Seel N.M. (eds) Encyclopedia of the Sciences of Learning. Springer, Boston, MA. https://doi.org/10.1007/978-1-4419-1428-6_772

Porter D.S., (2018). Spatial abilities of construction and related professionals. Colorado

Riecke, B. E. & von der Heyde, M. (2002). Qualitative Modeling of Spatial Orientation Processes using Logical Propositions

Saucier, D. M., Green, S. M., Leason, J., MacFadden, A., Bell, S., & Elias, L. J., (2002). Are Sex Differences in Navigaton Caused by Sexually Dimorphic Strategies or by Differences in the Ability to Use the Strategies? Behavioral Neruoscience

Schone H., (2016). Spatial Orientation: The Spatial Control of Behavior in Animals and Man

Sternberg R.J. & K. Sternberg. (2009). Cognitive Psychology, 6th Edition. Cengage Learning, Nelson Education

Sternberg, R. J., & Sternberg, K., (2012). Cognitive Psychology. Belmont: Wadsworth, Cengage Learning

Yuan L., Kong F., Luo Y., Zeng s., Lan J. F&You X. (2019) Gender Differences in Large-Scale and Small-Scale Spatial Ability: A Systematic Review Based on Behavioral and Neuroimaging Research. DOI: 10.3389/fnbeh.2019.00128